Space Weather Forecast

Issued on Friday, 20 May 2022 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 Radio Blackouts likely with Moderate-class X-ray flares. Chance of Strong flares and R3 Radio blackouts

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the last 24 hours with three Moderate class flares observed, the largest of which was from a small region to the southwest of the larger and more complex sunspot group in the central north disc. This larger region has continued to show some very slow growth. Despite this, flare activity of this region has remained somewhat muted so far, although the other two observed Moderate flares originated from this region. The five other regions on the disc remain much smaller, and are either stable or showing signs of declining. There were no Earth-directed Coronal Mass Ejections (CMEs) observed.

Solar Wind / Geomagnetic Activity: The solar wind continued slightly elevated to elevated during this period, with a small enhancement observed around 19/1318 UTC. This was also seen in the magnetic field carried by the wind, rising from weak to moderate levels at this time. However, the source of the enhancement was uncertain, likely due to interactions with a further fast wind arrival, but perhaps due to the arrival of a weak CME. The north-south component of the magnetic field remained weak however. Geomagnetic activity was Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no enhancement from any of the flares that occurred. Consequently no solar radiation storms occurred.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is Likely to be Moderate, with further M-class flares, and a Chance of an isolated Strong-class flare (R3 Radio Blackout). The main source of the activity is likely to be from the large central disc sunspot, although some further flaring is also possible the sunspot near this region that produced the larger moderate flare on the 19th, and with a lower chance from the other five regions.

Solar Wind / Geomagnetic Activity: A weak CME was observed which could have originated from AR3015 at 17/0510 UTC. This has been assessed as most likely passing behind Earth's orbit on day 1 (20th), but may give a glancing blow but with very low confidence. This possible has also already passed on the 19th. Slightly elevated to elevated solar winds are expected to persist through much of the period, as further coronal hole sourced fast wind influence is anticipate day 1 (20th). Geomagnetic activity is forecast to be Quiet with isolated Unsettled spells, and a chance of becoming Unsettled to Active on day 1.

Energetic Particles / Solar Radiation: The energetic particle count rate is expected to remain at background, but has a slight chance of increasing due to any large flares that may occur from AR3014. This giving a slight chance of solar radiation storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	25	20	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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